

GENERAL NOTES

OPOSSUM IN VERMONT

A full grown opossum was caught by A. A. Roberts, a professional trapper, at Dorset, Vermont, in the heart of the Green Mountains, in mid-December, 1920, long after the ground and streams had become frozen. The skin was seen by the writer. It was lightly furred, indicating that perhaps the animal had been in captivity, but inquiries in the locality and an item placed in local newspapers failed to locate any person who had had one of the animals as a pet. I can find no other record for the taking of this animal in Vermont, which is far north of its usual range.—GEORGE L. KIRK, *Rutland, Vermont*.

OPOSSUM CARRIES LEAVES WITH ITS TAIL

A number of years ago five living opossums were sent to the Field Museum of Natural History from southern Illinois. In the lot were one nearly grown female and four young, not her own, about the size of large house rats. After arrival they were kept temporarily in a wire-covered barrel. The second night the large female literally "ate alive" one of the young, and afterwards forced her escape from the barrel. She had eaten the hind quarters of the unfortunate youngster without first killing him, as attested by his contorted carcass and awful facial grimace when found cold and stiff next day.



After this episode I kept only one young opossum alive, in order to make a few studies from life of so curious a mammal. When the fall days began to grow cold I gave this fellow a thick carpet of autumn leaves in his box cage. Though he ate heartily of meat scraps, fruits, and vegetables, he was not contented. When not sound asleep in his favorite corner he pounded solemnly around and around his cage like a wild tiger, with a funny preoccupied look on his grinning face. One morning when I glanced into his cage I was surprised to see him pacing around his beat with a large bunch of leaves tightly rolled up in his long, prehensile tail. He carried this bundle so long, around and around in tireless pace, that I left him without learning the object of his action. Later he repeated

this carrying of a bundle of leaves in his tail a number of times. I noticed that he had made a half hearted attempt to build a nest in one corner, but had abandoned the idea and slept anywhere that he happened to be when drowsiness overcame him.

Opossums of course use their tails with agility in climbing, but I have never seen a note in mammalian history on the use of the tail as a carrier of material of any kind, so thought this account might prove of interest to readers of the Journal. The accompanying sketch shows accurately the manner in which the tail was employed in carrying bundles of leaves.—LEON L. PRAY, *Field Museum of Natural History, Chicago*.

NOTES ON THE EUROPEAN HEDGEHOG

Extracts from my journal, written at Ultuna, Sweden, 1898: *August 4.* A member of the faculty of the Agricultural College, located here, informed me that every night a hedgehog (*Erinaceus europæus*) was seen to leave a thicket near the campus, and make for the shrubbery along a small stream, where it fed during the night. We went out that evening to watch for it, and had about given up seeing it, when we heard a woman talking and found her in earnest conversation with the hedgehog. It stood a few feet away gazing at her, but on seeing us turned and ran under a building where it was captured. It did not roll up until I had handled it roughly. I was told that these animals fed on mice, berries, and scraps thrown from the kitchen.

August 5. Among the twenty-five specimens caught today, were two *Erinaceus*. One was taken in a steel trap baited with bread and set by the side of an out-building; the other in a Schuyler rat trap set in a barn and baited with rolled oats.

August 11. Last night I caught another *Erinaceus* in a steel trap baited with rolled oats. . . . A half-grown hedgehog that I keep in my room shows displeasure, when disturbed, by sniffing through his nose and making a noise in his throat that sounds like heavy heart-throbs. Occasionally he shakes himself, rattling his spines. When placed on a couch, he shows fear of falling, creeps cautiously to the side, lies prone, and peeps over the edge. I offered him bread and boiled potatoes, and, though he accepted them, he took a piece of raw meat much quicker. At first he started to roll up, but, on scenting the meat, uncoiled, accepted and ate it very slowly, all the time grating his teeth. He does not use his front feet while eating. Whenever I handle him he rolls up so tightly that it is difficult to find the opening. He does not attempt to bite [he did later however] even when I catch him before he is tightly closed and tickle his belly. I have just induced him to walk six inches to my hand and take a piece of raw meat from my fingers.

August 12. My pet *Erinaceus* is very interesting. He eats the bodies of both *Sorex* and *Neomys*, chewing the meat fine and eating slowly. It took him eight minutes to eat a half grown *Microtus*. Last evening I knocked from a table, and broke, a glass candlestick; and during the night the hedgehog awakened me by rolling one of the pieces about the floor. Then he began scratching on the side of the chamber vessel and I chased him away, but he returned and I had to remove the vessel in order to sleep. He is very active. I can call him from

the far side of the room by tapping on the carpet with my fingers and when he comes up, possibly with the expectation of being fed, he shows his displeasure by snuffing and butting at my hand. Whenever I try to pick him up he hugs the floor, sniffs, and butts sidewise at my hand. A bowl of drinking water on the floor he tipped over on its side, and then, putting his nose against it, rolled it about the room; went away, but came back and repeated the performance several times. These animals seem to be incapable of digging. I have had six of them for over a week confined in a wire enclosure built on the ground and they have made only feeble attempts to dig out.

August 15. Notwithstanding that I have been told repeatedly that hedgehogs eat berries greedily, I have not succeeded in coaxing my pet to do so, although there has been a handful each of strawberries, huckleberries, and squawberries in a corner of the room for two days. When he sleeps, unless he is confined in a small space, he does not roll up, but lies on his side half coiled like a dog.

August 17. My little *Erinaceus* spent the day—dark and rainy—running about the room. He stands high and at any sudden noise, such as the slamming of the door or dropping of a book, jumps nervously. At the first sign of danger he squats, ducks his head, and throws the spines on his head forward preparatory to rolling up. Several times he has bitten my fingers but it is never more than a hard pinch. I gave him a small *Microtus* and two *Sorex* and in eating the last *Sorex* it took him exactly sixteen and a half minutes. I have just finished making up the skins of five adult animals of this species. Adhering to the skin on the back, and between the fat on the body and the skin, is a sheet of fleshy muscle an eighth of an inch in thickness which terminates abruptly and is much thicker at its outer edge. This fleshy muscle, covering the area occupied by the spines, is similar to that found on the skin of a porcupine and probably is for the purpose of erecting the spines. A broad and much thicker band of muscle encircles the entire body at a point where the spines and the hair unite. It passes over the top of the head and acts as a puckering string when the animal curls up. To do this, he simply ducks his head, humps his back, and contracts the muscle band. By placing my fingers against his belly and tickling until he curls up, I can distinctly feel this band. Last night my pet managed to climp up on the bed and wakened me by sniffing and butting sidewise against my cheek.—J. ALDEN LORING, *Owego, N. Y.*

SHREWS AND WEASELS

It is pretty generally known that most animals, both wild and domestic, will not eat the short-tailed shrew (*Blarina*) and the distaste for the little mammal seems to be shared by the weasel. Is the aversion mutual?

In December the writer had a trap set for weasels under a brushy fence. The place was infested with blarinas and they were attracted to the rabbit bait and caught regularly. A weasel will take almost any kind of bait in the form of flesh, but tracks in the snow showed that if a Bonaparte weasel approached the trap when it held a shrew, it kept at a distance of four inches and refused to touch the bait. The *Blarina* was removed and the next morning the trap held a weasel. The snow indicated that blarinas had run back and forth under the brush several times but the weasel was untouched. White-footed mice and field mice (*Peromyscus* and *Microtus*), which had previously been caught in the trap, were almost entirely consumed by the shrews.—GEORGE L. KIRK, *Rutland, Vermont.*

THE HOG-NOSED SKUNK (*CONEPATUS*) IN COLORADO

The middle of December, 1920, Mr. C. E. Aiken of Colorado Springs, Colorado, showed me the skin and skull of a skunk which had been brought to him for mounting, and which was at once recognized as a species of *Conepatus*, a genus hitherto unreported from Colorado. This specimen was taken by Mr. Sam. Keaton near his ranch on Little Fountain Creek, some twelve miles southwesterly from Colorado Springs, at the edge of the foothills. Mr. Keaton has lived on this place from his boyhood, since 1873, and while he has trapped *Mephitis* and *Spilogale* there, he had never before seen a skunk like this, and recognizing it as something new, was afraid to shoot it for fear of injuring it too much, therefore threw stones at it, chased it, and finally threw himself down upon the animal and strangled it with his hands. This was some time between the first and tenth of December, 1920.

Mr. Aiken, who has kindly consented to my publishing this record, gave me permission to send the specimen to the Biological Survey for identification, and I received two letters from Mr. E. W. Nelson, chief of the Survey, concerning it. In one he remarks that the record from a locality so far north is a very interesting and surprising one, the most northern one in the Biological Survey files being from the vicinity of Albuquerque, New Mexico. In the second letter, written a few days later, after the specimen had been compared with material in the Biological Survey collection, he states that the animal is a young one, and is provisionally referred to *Conepatus mesoleucus mearnsi* Merriam.

If the specimen is a young one, and it certainly appears to be small, it would seem possible that a litter may have been raised in that locality and that there may be more there. And this brings up the question as to whether this, or its family, if there is a family, is merely a straggler, or whether the hog-nosed skunk is extending its range to the northward and until now has escaped notice. The locality is somewhere about the boundary between the Transition and Upper Sonoran zones.—EDWARD R. WARREN, *Colorado Springs, Colo.*

THE ELEPHANT SEAL OFF SANTA CRUZ ISLAND, CALIFORNIA

I was recently asked to identify a strange creature that had been seen by one of the fishermen plying out of the harbor of San Diego. The man stated that his boat was about five miles southwest of the south end of Santa Cruz Island when he encountered a large school of herring, which were followed by a number of whales and the usual school of albacore. As the boat arrived on the scene a strangely weird animal appeared from the depths, rearing its head a yard or more above the waves, only a hundred feet from the fishermen. After staring at them for a moment it sank with a splash and reappeared some hundred yards distant. The description was so accurate that there is very little doubt but the animal was a large male elephant seal, *Mirounga angustirostris*. This record would seem to give credence to a report that came to me about a year ago, of a seal of this species being shot off Santa Catalina Island.

Fifty years ago the elephant seal was abundant on the Channel Islands and as far south on the Mexican coast as about 26° north lat. Constant persecution reduced its numbers, until twenty years later it was considered nearly, if not

quite extinct. A small colony, living on Guadalupe Island, escaped destruction, though raided on several occasions, and from late reports there would seem to be a few scattered remnants to remind us of this once abundant species.—A. W. ANTHONY, *Nat. Hist. Museum, Balboa Park, San Diego, California.*

MICE AND CHIPMUNKS HELP RESTOCK FORESTS

Mice and chipmunks are helping to reestablish the forests of Oregon and Washington, according to officials of the Forest Service, United States Department of Agriculture. Studies made by J. V. Hofmann, director of the Wind River Forest Experiment Station at Stabler, Washington, have shown that a large part of the young fir growth coming in on burned or logged areas in these States is not wholly due to seeding by occasional trees which are left, but in part to seed buried by small rodents beneath the duff of the forest floor.

In the West mice and other rodents are usually condemned as workers of evil in the forest. They often do considerable damage to food supplies, and their appetite for pine and fir seed is chiefly responsible for the abandonment of attempts to reforest burned-over and waste areas by direct seeding methods. Sometimes, however, the work of these little animals is beneficial.

"In the Douglas fir region," says Mr. Hofmann, "the forests produce a heavy seed crop every two or three years. Rodents collect the seed from the cones in large quantities and bury them just beneath the surface of the soil. Part of the seed thus stored away is eaten, but snow and soil movement often cover many of the hoards so that they are never found. When logging operations open up the stand, these seed germinate and produce a new stand of little trees."

The Wind River Experiment Station is but one of several similar establishments maintained by the Government in the national forests for solving forestry problems. In this particular case many thousands of dollars have been saved annually to western lumbermen through the assistance of rodents in restocking cut-over lands. This is one example of the value of the experiments being carried on by these stations, which are so important to the perpetuation of our forests and dependent industries.—U. S. DEPARTMENT OF AGRICULTURE PRESS SERVICE, *Washington, D. C.*

A RECENT MIGRATION OF THE GRAY SQUIRREL IN WISCONSIN

In a previous paper I have noted a migration of northern gray squirrels (*Sciurus carolinensis leucotis*) across the Mississippi River from Wisconsin into Minnesota during the autumn of 1905. The migration may have been caused by a shortage of nuts on the Wisconsin side of the river (Bull. Wisconsin Nat. Hist. Soc., vol. 8, p. 87, 1910).

On a field trip for the United States Biological Survey during the past summer (1920), I had occasion to visit Pepin, Wisconsin. While there, Mr. Broach, a reputable citizen of that village, told me about a migration of gray squirrels which occurred early in the fall of either 1914 or 1915. The squirrels came from the hills 2 or more miles back of Pepin, followed a point out into the foot of Lake Pepin, and there swam a distance of about $\frac{1}{4}$ mile across the Mississippi River to the Minnesota shore. Mr. Broach would give no estimate of the number

of squirrels but said "there was a continuous movement, and possibly an average of two entering and two emerging from the water every few minutes for about a day." Mr. Broach stated that there was no food shortage of the Wisconsin side of the river, there being an abundant crop of acorns, nuts, and corn.—HARTLEY H. T. JACKSON, *U. S. Biological Survey, Washington, D. C.*

CÆSARIAN OPERATION ON *LEPUS ALLENI*, AND NOTES ON THE YOUNG

On March 13, 1920, a female *Lepus alleni* was shot on the Santa Rita Range Reserve, south of Tucson, Arizona, for breeding record. When the body was opened, three very large fetuses were discovered, and after a little hesitation it was decided to open the uterus and note the condition more definitely. No sooner was this done with the first than on the freeing of the head the young animal began to breathe precisely as if normally born. After a little further hesitation, which nearly resulted fatally for the third youngster, it was further decided to release all of them and see whether they would survive. This was done as quickly as possible, with the result that in a few moments all three were lying across the warm body of the mother in the sunshine, breathing normally; and in a surprisingly short time attempting to find a nipple for nursing. In actual fact, the first one released from the amnion was attempting to suckle before the third one was fully freed. No bleeding whatever occurred when the umbilical cords were cut although this was done immediately on releasing them from the membranes, which fact would indicate that they must have been normally born within a very short time, probably within the ensuing twenty-four hours. As the eyes were open from the first, there can be no doubt that they are open at normal birth in this species.

The sun was bright and warm, the hour being 10.00 a.m., and there was scarcely a perceptible breeze, so that no difficulty was experienced in keeping the diminutive jacks warm until they were thoroughly dry. In the meantime they kept close up against the now cooling body of the mother, whose nipples they repeatedly sucked upon. However they evidently secured no milk, as none would hold to a teat for more than a few seconds.

Some photographs were taken of them alongside the body of the mother, after which they were wrapped carefully and taken to camp on the seat of the car. Here for a few hours they were kept warm and contented in the sunshine and were fed a small amount of milk from a spoon. During the afternoon they were taken on a forty mile trip to Tucson, and established in a box with plenty of old woolen blanket for warmth. After several attempts to feed them in various ways an ordinary pipette was found to be most satisfactory. About five pipettes full of warm cow's milk, amounting to from 8 to 10 cc., constituted a feed during the first day, and three feedings per day were decided upon after some observation. The second day condensed milk, diluted with an equal quantity of water, was substituted for fresh cow's milk.

Owing to the fact that very little exposure would chill the little animals, measurements were not taken on the first days of life. All were weighed however, and the weights were 108, 103.5, and 90 grams, respectively, at noon of the day they were taken. In spite of every care and the use of the same food, the smallest did not thrive from the first as the others appeared to do. It ate as much

but was not so active, and did not make the gain in weight and activity which was at first noticeable in the others. By March 18, the fifth day, it would no longer take food to any extent. The larger ones by this time would drink avidly about 15-20 cc. at a feeding. In fact this small individual was so nearly dead on the evening of this day as to justify killing it.

During the next two or three days, first one and then the other of the remaining two became ill, and in spite of all attempts to save them with dietary variations the second died at the close of the eighth day, and the third on the tenth day. A mother cat with a kitten the same age as the young rabbits was located at a neighbor's the seventh day and the two rabbit babies were offered to her and at once accepted, but this proved to be too late to save either of them. It was felt that had she been discovered early in the week the rabbits might have been successfully reared, and it is hoped to secure again at some future date the young of this species for observation throughout the growth period, and to secure a cat as foster mother.

On March 18th the remaining two were measured as accurately as possible with results as follows:

	<i>Length</i>	<i>Tail</i>	<i>Foot</i>	<i>Ear</i>
No. 1.....	150 mm.	8.0 mm.	40 mm.	37 mm.
No. 2.....	150 mm.	8.5 mm.	45 mm.	40 mm.

A marked tendency to nocturnal habits was noted on the second day of life, and this became more marked in succeeding days. This was evidenced in the fact that not one of the three would accept milk at noon, after a morning feeding. However, by 4.30 or 5.00 p.m. food was readily accepted, and again at night from 9.30 to 10.30. Indeed the alertness and activity of all was much more marked at this hour than during any of the daylight hours, which latter were spent in sleep. Even when effort was made little activity could be aroused, and no interest in food was ever shown at midday. In the night, however, as soon as coverings were removed the young rabbits would quickly rouse up, raise heads, erect the ears, and crawl or hop about and search for food. On the night of March 17 when a light was switched on at a few minutes after ten o'clock, I was much surprised to see the two larger ones emerge from the coverings with ears erect, hop to the side of the box nearest me, and make an effort to climb out. This was in fact easily accomplished by the first, which could barely reach the top edge of the small box from the blanket on which it stood.

The incisor teeth of these specimens were so well developed that bits of lettuce, apple and other fresh succulent vegetables were offered them, but no interest whatever was manifested in such foods. It is a source of regret that the desirability of saving the skulls was overlooked until too late. The pelage was well developed, the young being so fully clothed from the first in short fur as to give no impression of the semi-nakedness seen in so many young mammals born with partially developed pelage.

In coloration the young were typical *alleni* as to the ears, with their posterior edges of white, and as to general ground color, except that they were perhaps a trifle darker than the average adult. Each had a small but distinct white spot in the center of the forehead, which is not present in the adult. The white of the side and belly was never drawn up on the back and side during the few days

the young were under observation, a movement so characteristic of the frightened adult as to have caused this species to be known as the "antelope jack-rabbit."
—CHAS. T. VORHIES, *University of Arizona, Tucson, Ariz.*

DATES OF SHEDDING OF HORNS IN YELLOWSTONE PARK

During the season of 1919-1920 the dates of shedding of horns by wild antelope, elk, and deer in the Yellowstone National Park, Wyoming, were as follows: Prong-horn antelope, October 20 to November 25; elk, March 19 to May 4; white-tailed deer, January 15 to February 20; and mule deer, January 6 to March 25. Horns from many weak and decrepit elk and deer fell much earlier than usual, and that is the reason for the early dates above. The lack of vigor of these animals was due, of course, to the hard winter and want of suitable food.—M. P. SKINNER, *Yellowstone National Park, Wyoming.*

SHED HORNS OF THE AMERICAN ANTELOPE

The following notes were brought out by the article on the horns of the antelope in the May, 1920, *Journal of Mammalogy* from the pen of Mr. Vernon Bailey and were sent to him as a private letter. It has been suggested that they are of enough interest to be printed in the *Journal*. What they tell has been known to certain observers for many years, but has perhaps not been published.

Thirty or forty years ago, when antelope in their range were enormously abundant, shed horn sheaths were often seen on the prairie. Usually, they were in bad condition. Many years ago, at my request, Capt. L. H. North made an experiment which showed that these horn sheaths offer little resistance to the weather and are very perishable. I think it was in December in the late '70s—probably 1878—that he killed, in western Nebraska, an antelope, from whose head as it fell both horn sheaths dropped off. Mr. North put the sheaths together, and noted the spot, and now and then through the winter in his range riding looked at the horns. In the early summer they began to split and crack, and in late August or September following, when we last looked at them, they had practically disappeared, and there remained only a few long black splinters of horn. The hard tips were recognizable when carefully looked for, but no one who was passing by on foot or on horseback would have noticed that there was anything lying on the ground. In those days, food was far more abundant on the prairie than of late years. Even then no doubt coyotes may have gnawed the antelope horns, but many of them were left untouched.

Since in those early days the antelope was the most abundant and most universally distributed large mammal on the plains, it was one of those most frequently killed for food. When a buck antelope was killed, late in the season, it often happened that if one took hold of the horn to turn the head so as to cut the animal's throat, the horn sheath slipped off in the hand. The new horn below was always hard at the tip, but for only a short distance back from the end. It was covered almost to the tip with long growing hairs, somewhat as shown in Mr. Bailey's figure 1, plate 8, in the *Journal of Mammalogy*. The hard black end of the sheath was very short and the hair clothed skin extended almost up to the end of the sheath.

As time went on, the black, hard tip of the horn extended further and further down toward the head—the hair apparently coalescing to form this black horn—and the active growing hairy skin surface toward the base of the horn became more and more reduced in vertical length.

We know little, as has been said, about the process of shedding and renewing these horn sheaths; but for many years I have believed that at the close of the rutting season, say early in October, the periosteum of the horn core becomes more active and thicker, takes on the character of the body skin, hairs begin to grow from it rapidly, and as these hairs grow the old horn sheath is pushed away from the core and up and off the sheath. The result of this is that by late fall or winter the whole horn sheath is loosened and ready to drop off.

In old times hunters trying to save their antelope heads occasionally carried the skulls tied—often by the horns—to the wagon bows or wagon axles, and sometimes lost skulls or horn sheaths or both, because if the periosteum of the horn core began to decay, the sheath slipped off and was lost. Even at the period of the rut, if the sheath were separated from the horn core, fine hairs were seen growing from the skin on the horn core.

The season for the shedding of the horn sheaths is late fall or early winter, the time running from November 15 to the end of December.

The rut takes place two months earlier—during September—and at this time there is much fighting among the males, though I have never seen anything like the account given by Audubon, which of course he received from others. Often the fighting does not become an actual battle, but one of the males rushes at another which turns and runs, to be pursued by the stronger for a mile or more.

Sometimes, however, there is actual contact and the antelope come together, head on, with a certain amount of violence, and then push hard for two or three minutes, when the weaker, by a swift sidewise bound and turn, saves himself from the horns of the stronger and runs. It is possible that the shock of the horns coming together might have a tendency to loosen the horn sheaths.—GEO. BIRD GRINNELL, *New York City*.

FIELD SUGGESTIONS

For one reason or another, it is sometimes advisable while on a field trip to carry small mammals "flat" instead of making up the skins on the spot. If the following suggestions are adopted the final preparation of the specimens will be materially facilitated. Leave in all the leg bones, for it is sometimes difficult to relax the feet to the extent where wires can be inserted. Leave the specimens inside out and then prepare a small cardboard form of the shape used for stretching cased furs, over which the skin should be drawn, care being taken that the ears are not left pointing forward. Cut a notch in each side of the form so that the posterior edges of the skin will be caught by them and prevented from shrinking unduly. This cardboard may be cut an inch longer than necessary and the data written upon it. Finally, the usual tail wire should be wound with cotton, dipped in arsenic, inserted, and then bent back over the skin, so the tail will be out of the way. Unless this is done it is often impossible to relax the tail sufficiently to allow a wire to be inserted without causing the hair to slip. I have sometimes worked for an hour over an especially refractory tail.—A. BRAZIER HOWELL, *Pasadena, California*.